EPA Region 7 TMDL Review

TMDL ID: NE-WH1-20000 **Water Body ID:** NE-WH1-20000
Water Body Name: White River-Hat Creek Basin

Tributary: White Clay Creek and Soldiers Creek
Pollutant: E. coli Bacteria
State: Nebraska **HUC:** 10140201
BASIN: White River-Hat Creek Basin
Submittal Date: December 13, 2005
Approved: Yes

Submittal Letter

State submittal letter indicates final TMDL(s) for specific pollutant(s)/water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.

A letter dated December 8, 2005 was received by EPA on December 13, 2005, formally submitting this TMDL for approval under Section 303(d).

Water Quality Standards Attainment

The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.

Nebraska WQS for Primary Contact Recreation states *"E. coli Bacteria"* shall not exceed a geometric mean of 126 colony forming units (cfu) /100 mL. This criterion applies during the recreational period of May 1 through September 30.

Allocations are based on the expected reduction of the bacteria loading under defined flow conditions, where flow conditions are defined by the presumed ability of point or non-point sources to be the dominant influence on stream water quality. Flow duration curves were developed from the applicable gage station sites and translated into a TMDL load curve by multiplying the flow curve by the water quality criteria (and a conversion factor). The water quality samples are converted to loads by multiplying the samples by the average daily flow and are then plotted on the TMDL load graph. The TMDL curve depicts the WQS and represents a continuum of desired loads over all flow conditions that will attain WQS for bacteria. TMDL values shown on the load duration curves are set at levels which will result in attainment of WQS. The TMDL for this segment is given as a 31% percent reduction in nonpoint sources; the single NPDES permitted wastewater facility has end-of-pipe limits to meet water quality standards. This reduction should result in water quality standard attainment.

Numeric Target(s)

Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

Assigned beneficial uses for the listed segment are Primary Contact Recreation, Aquatic Life Coldwater Class B, Public Drinking Water Supply, Agriculture Class A, and Aesthetics. This White River-Hat Creek Basin segment was listed as impaired in the Nebraska 2002 section 303(d) list because of *E. coli. bacteria*. In Nebraska's 2004 Surface Water Quality Integrated Report this segment was listed as impaired for Primary Contact Recreation. Water quality targets for *E. coli bacteria* are 126 cfu/100 mL as a geometric mean and apply during the recreational period of May 1 – September 30.

Numeric Target(s) and Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.

The water quality standard for *E. coli* is 126 cfu/100 mL as a geometric mean during the recreational period. This is a direct measure. WLA in this TMDL is given as concentration, directly targeting the criterion. LA is expressed as a 31 percent reduction in loading which will result in the target concentration. The margin of safety is given as an extra percent reduction of LA to target concentrations 10% below the criterion.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.

Both point and nonpoint sources (including natural sources) have been in the White River-Hat Creek Basin segment. Due to the size of the watershed, the somewhat limited data, the delivery methods and the location of the potential sources in relation to the impaired waterbody; it is difficult to definitively identify specific sources.

The method used for demarcation on the load curves between point source and nonpoint sources is the greater of the 7q10 low flow or the stream flow volume necessary to dilute the point source effluents to compliance with the water quality criteria.

The point source that discharges directly to the White River recreation segment is the Crawford WWTF (NE0039799). Non-discharging confined animal feeding operations and lagoons are also present in the watershed. Non-point and natural sources are diverse in nature, distribution and delivery method, and are not be separated.

All sources appear to have been considered.

Allocation

Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.

Allocations are based on the expected reduction of the bacteria loading under defined flow conditions, where flow conditions are defined by the presumed ability of point or non-point sources to be the dominant influence on stream water quality. The demarcation on the load curves between point source and nonpoint sources is the greater of the 7q10 low flow or the stream flow volume necessary to dilute the point source effluents to compliance with the water quality criteria.

WLA Comment

Waste load allocations (WLAs) provided for NPDES permitted facilities (including discharges from regulated storm water outfall), do not allow for application of a mixing zone for the initial assimilation of effluents in order to meet the criteria associated with the recreation beneficial use. Because of this, the water quality criteria are applied to the "end-of-pipe" concentrations and are applicable at all stream flows >7q10. Therefore, the *E. coli* waste load allocation established by this TMDL will be a monthly geometric 126 cfu/100 mL. Non-discharging facilities WLAs are set to zero.

LA Comment

The Load Allocation (LA) assigned in this TMDL is be based upon stream flow volume defined as that demarcation of the individual load duration curves where there are non point source contributions; flow greater than 26 cubic feet per second (cfs). The LA is a 31% reduction during periods when discharge is > 26 cfs.

Margin of Safety

Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.

This TMDLs contains an implicit and explicit margins of safety. Implicit MOSs include not accounting for decay and/or die off of *E.coli* and the assumption that WWTPs discharge *E. coli* at the permitted density, when in fact, many of the plants provide disinfection that is sufficient to achieve 100% reduction in the indicator bacteria

To account for uncertainty in the nonpoint source load reduction, the targeted reductions will be set at 90% of the *E. coli* water quality target (126 cfu/100ml). Specifically the reductions shall be applied to meet an *E. coli* seasonal geometric mean of <113 cfu/100ml, an explicit MOS of 13 cfu/100mL.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).

Seasonal variation is considered in the recreational season of May 1 – September 30 and is reflected in the TMDL load duration curve, where flows generally depend on the season. Critical conditions are accounted for in the TMDL load duration curve.

Public Participation

Submittal describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).

The availability of the TMDL in draft form was published in the Crawford with the public comment period running from approximately October 10, 2005 to December 1, 2005. This TMDL was also made available to the public on the NDEQ's Internet site and interested stakeholders were informed via email of the availability of the draft TMDL. No comments were received during the public participation period.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies the monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used).

Future monitoring will be consistent with Nebraska's rotating basin monitoring scheme; the next targeted monitoring phase for the basin is 2008. An effort is to be made in expanding the monitoring. Compliance monitoring and require self-monitoring information from NPDES permittees will be used in assessing the success of these TMDLs as well. Microbial source tracking may be used in the future as this science progresses to be more user friendly.

Reasonable assurance

Reasonable assurance only applies when reductions in nonpoint source loading is required to meet the prescribed waste load allocations.

Although reasonable assurances are not required for this TMDL because permitted facilities WLAs are set to meet water quality standards, Nebraska has identified several Federal, State, local, and non-government organizations that may be included in the implementation process, as well as enforcement and compliance measures as needed for NPDES permits.